LIGHT MASKING FOR A SEGMENTED DISPLAY SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U. S. Provisional Patent Application Serial No. 60/531,732, entitled "Moveable Light Masking for Segmented Displays" and filed December 22, 2003, which is incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

The present invention generally relates to the field of displays, and more particularly to segmented display systems including multiple projection devices.

BACKGROUND OF THE INVENTION

Segmented display systems generally employ multiple projection devices and multiple display devices. Each projection device projects a portion of an image on a corresponding one of the display devices. For many segmented display systems, the display devices are arranged in a square array (N x N), such as, for example, a 2 x 2 array, as shown in FIG. 1.

In many segmented display systems, each projection device provides extra light that may undesirably distort projected images. Some segmented display systems use a cloth mask next to the lamp to block the extra light. However, the lamps used are 100 watt lamps that create a fire hazard when in proximity to the cloth mask.

Thus, there is a need for a segmented display system which minimizes distortion from extra light of the displayed images.

SUMMARY OF THE INVENTION

The present invention is directed to a segmented display system in which the display devices are arranged in a N x 1 array. The segmented display system includes a plurality of projection devices that each project a portion of an image on a corresponding one of the display devices in the N x 1 array. Distortion from extra light is minimized using a moveable mask around each projection device lens in the N x 1 array.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is hereinafter described in detail with reference to the accompanying drawings, in which:

FIG. 1 depicts a segmented display system in which display devices are arranged in a 2 x 2 array;

FIG. 2 depicts a front view of a segmented display system of the present invention in which display devices are arranged in a N x 1 array;

FIG. 3 depicts a top view of the segmented display system shown in FIG. 2 in which display devices are arranged in the N x 1 array;

FIG. 4 depicts a side view of the segmented display system shown in FIG. 2 in which display devices are arranged in the N x 1 array including a moveable mask on the lens of the projection device;

FIGS. 5A-B depict assembled top and side views of the moveable mask of FIG. 4; and

FIGS. 6A-E depict top, side and bottom views of a mask frame and mask of the moveable mask shown in FIGS. 5A-B.

DETAILED DESCRIPTION

The present invention is directed to a segmented display system in which the display devices are arranged in a N x 1 array. Referring the FIGS. 2-4, the segmented display system 100 includes a plurality of projection devices 110A, 110B, 110C, 110D that each project a portion of an image on a corresponding one of the display devices 111A, 111B, 111C, 111D in the N x 1 array.

Referring to FIG. 4, each projection device 110A, 110B, 110C, 110D includes a lamp 120, a mirror 125, a lens mounting 130 and a moveable mask 140. The lamp 120 of each projector projects that portion of the image to be projected onto the mirror 125 and than to the corresponding one of the display devices 111A, 111B, 111C, 111D in the N x 1 array.

The mirror 125 is placed at an angle of about 45 degrees relative to the lamp 120 and the display devices 111A, 111B, 111C, 111D. Using a mirror at about 45 degrees with respect to the lamp 120 maintains bulb lifetime due to thermal heating in the lamp 120.

FIGS. 5A-B depict top and side views, respectively, of the moveable mask on the lens of each projection device. For the 4 x 1 array an assembled mask includes a mask frame 143 into which a mask 145 for each lens 130 is provided. Individual masks and frames for each lens may also be used. The mask frame 143 may be formed of a light absorbing material. The mask 145 is fitted around the lens 130 and is moveable on the mask frame 143. The mask 145 is moveable on the mask frame 143 so that each projection device 110A-D may be individually aligned to its respective display device 111A-111D of the segmented display system. FIGS. 6A-6E depict top, side and bottom views of a mask frame 143 and mask 145 of the moveable mask 140 shown in FIGS. 5A-B.